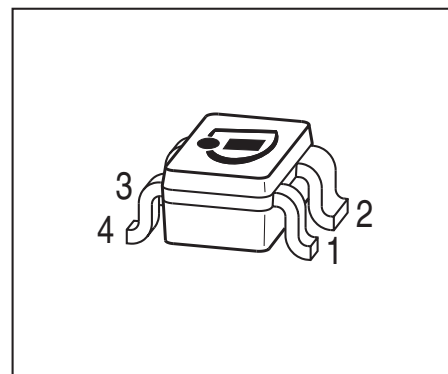


NPN Silicon Germanium RF Transistor

- High gain ultra low noise RF transistor
- Provides outstanding performance for a wide range of wireless applications up to 10 GHz and more
- Ideal for CDMA and WLAN applications
- Outstanding noise figure $F = 0.5$ dB at 1.8 GHz
Outstanding noise figure $F = 0.85$ dB at 6 GHz
- High maximum stable gain
 $G_{ms} = 27$ dB at 1.8 GHz
- Gold metallization for extra high reliability
- 150 GHz f_T -Silicon Germanium technology
- Pb-free (RoHS compliant) package ¹⁾
- Qualified according AEC Q101



ESD (Electrostatic discharge) sensitive device, observe handling precaution!

Type	Marking	Pin Configuration						Package
BFP740	R7s	1=B	2=E	3=C	4=E	-	-	SOT343

¹Pb-containing package may be available upon special request

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage $T_A > 0^\circ\text{C}$ $T_A \leq 0^\circ\text{C}$	V_{CEO}	4 3.5	V
Collector-emitter voltage	V_{CES}	13	
Collector-base voltage	V_{CBO}	13	
Emitter-base voltage	V_{EBO}	1.2	
Collector current	I_{C}	30	mA
Base current	I_{B}	3	
Total power dissipation ¹⁾ $T_S \leq 89^\circ\text{C}$	P_{tot}	160	mW
Junction temperature	T_{j}	150	$^\circ\text{C}$
Ambient temperature	T_{A}	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ²⁾	R_{thJS}	≤ 380	K/W

Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage $I_C = 1 \text{ mA}, I_B = 0$	$V_{(\text{BR})\text{CEO}}$	4	4.7	-	V
Collector-emitter cutoff current $V_{\text{CE}} = 13 \text{ V}, V_{\text{BE}} = 0$	I_{CES}	-	-	30	μA
Collector-base cutoff current $V_{\text{CB}} = 5 \text{ V}, I_{\text{E}} = 0$	I_{CBO}	-	-	100	nA
Emitter-base cutoff current $V_{\text{EB}} = 0.5 \text{ V}, I_{\text{C}} = 0$	I_{EBO}	-	-	3	μA
DC current gain $I_C = 25 \text{ mA}, V_{\text{CE}} = 3 \text{ V}, \text{pulse measured}$	h_{FE}	160	250	400	-

¹⁾ T_{S} is measured on the collector lead at the soldering point to the pcb

²⁾ For calculation of R_{thJA} please refer to Application Note Thermal Resistance

Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency $I_C = 25\text{ mA}$, $V_{CE} = 3\text{ V}$, $f = 2\text{ GHz}$	f_T	-	42	-	GHz
Collector-base capacitance $V_{CB} = 3\text{ V}$, $f = 1\text{ MHz}$, $V_{BE} = 0$, emitter grounded	C_{cb}	-	0.08	0.14	pF
Collector emitter capacitance $V_{CE} = 3\text{ V}$, $f = 1\text{ MHz}$, $V_{BE} = 0$, base grounded	C_{ce}	-	0.24	-	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$, $V_{CB} = 0$, collector grounded	C_{eb}	-	0.44	-	
Noise figure $I_C = 8\text{ mA}$, $V_{CE} = 3\text{ V}$, $f = 1.8\text{ GHz}$, $Z_S = Z_{Sopt}$ $I_C = 8\text{ mA}$, $V_{CE} = 3\text{ V}$, $f = 6\text{ GHz}$, $Z_S = Z_{Sopt}$	F	- -	0.5 0.85	- -	dB
Power gain, maximum stable ¹⁾ $I_C = 25\text{ mA}$, $V_{CE} = 3\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 1.8\text{ GHz}$	G_{ms}	-	27	-	dB
Power gain, maximum available ¹⁾ $I_C = 25\text{ mA}$, $V_{CE} = 3\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 6\text{ GHz}$	G_{ma}	-	17	-	dB
Transducer gain $I_C = 25\text{ mA}$, $V_{CE} = 3\text{ V}$, $Z_S = Z_L = 50\text{ }\Omega$, $f = 1.8\text{ GHz}$ $f = 6\text{ GHz}$	$ S_{21e} ^2$	- -	24.5 13.5	- -	dB
Third order intercept point at output ²⁾ $V_{CE} = 3\text{ V}$, $I_C = 25\text{ mA}$, $Z_S=Z_L=50\text{ }\Omega$, $f = 1.8\text{ GHz}$	IP_3	-	25	-	dBm
1dB Compression point at output $I_C = 25\text{ mA}$, $V_{CE} = 3\text{ V}$, $Z_S=Z_L=50\text{ }\Omega$, $f = 1.8\text{ GHz}$	P_{-1dB}	-	11	-	

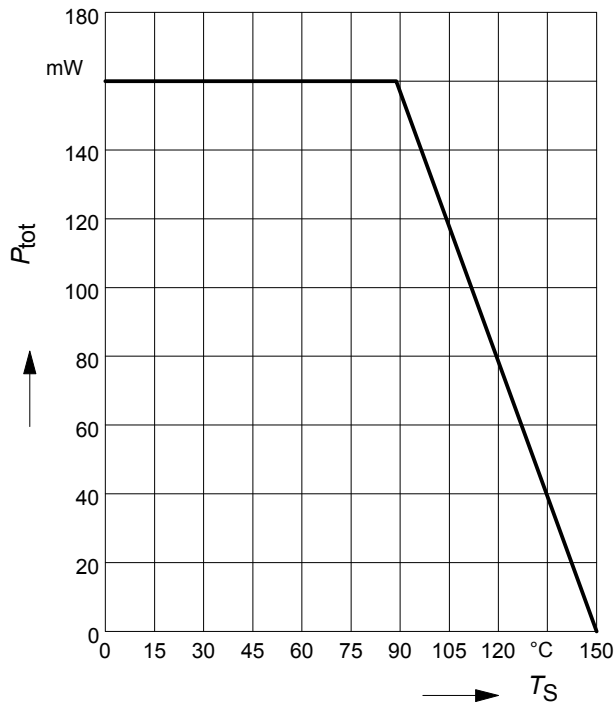
¹⁾ $G_{ma} = |S_{21e}| / |S_{12e}| (k - (k^2 - 1)^{1/2})$, $G_{ms} = |S_{21e}| / |S_{12e}|$
²⁾ IP_3 value depends on termination of all intermodulation frequency components.
Termination used for this measurement is $50\ \Omega$ from 0.1 MHz to 6 GHz

Simulation Data

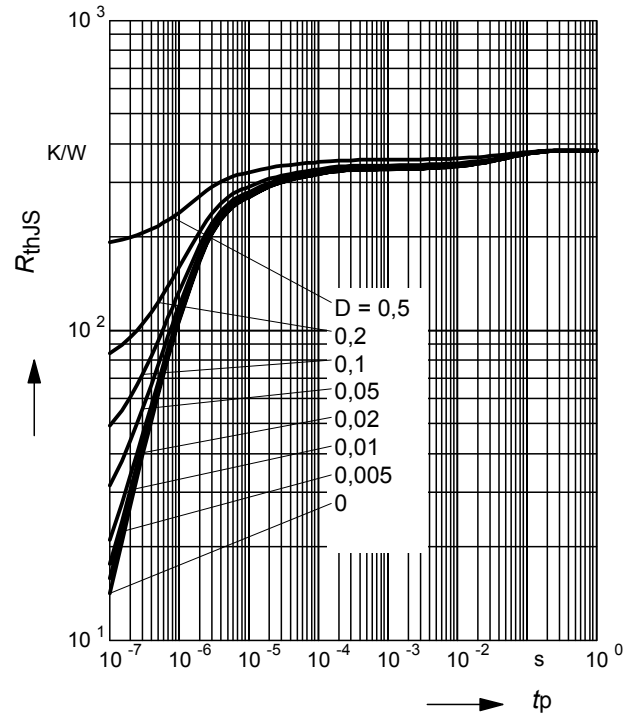
For SPICE-model as well as for S-parameters including noise parameters refer to our internet website: www.infineon.com/rf.models. Please consult our website and download the latest version before actually starting your design.

The simulation data have been generated and verified up to 12 GHz using typical devices. The BFP740 nonlinear SPICE-model reflects the typical DC- and RF-device performance with high accuracy.

Total power dissipation $P_{\text{tot}} = f(T_S)$

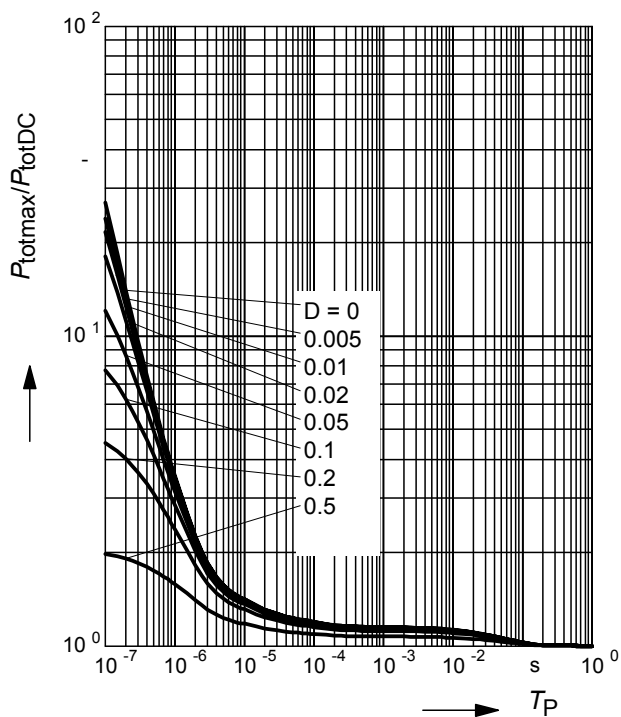


Permissible Pulse Load $R_{\text{thJS}} = f(t_p)$



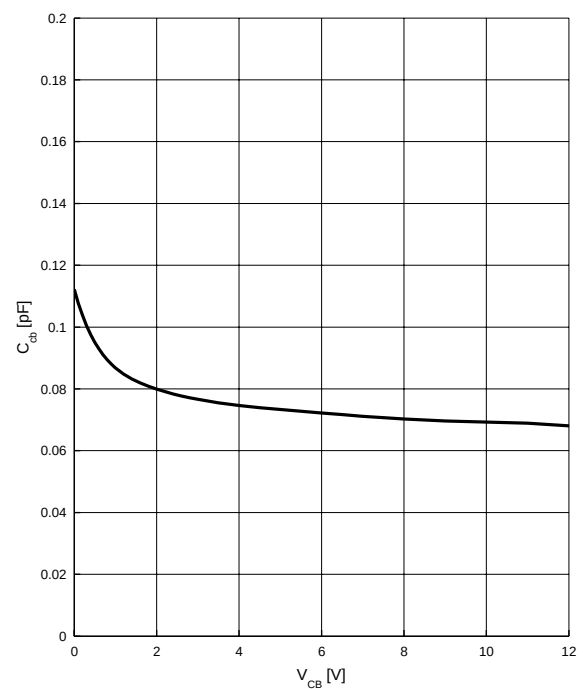
Permissible Pulse Load

$$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$$



Collector-base capacitance $C_{\text{cb}} = f(V_{\text{CB}})$

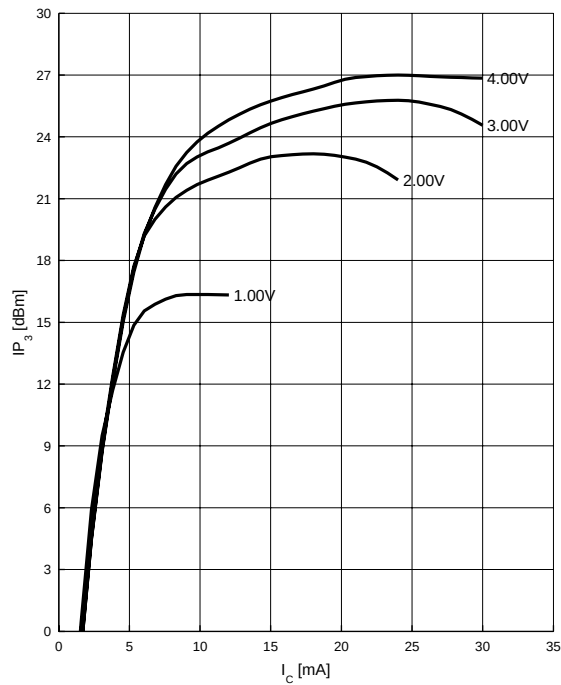
$f = 1 \text{ MHz}$



Third order Intercept Point $IP_3 = f(I_C)$

(Output, $Z_S = Z_L = 50 \Omega$)

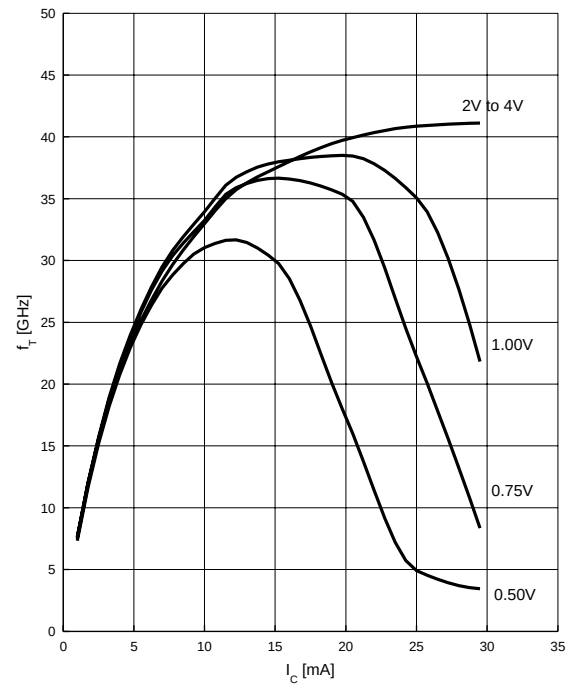
V_{CE} = parameter, $f = 1.8 \text{ GHz}$



Transition frequency $f_T = f(I_C)$

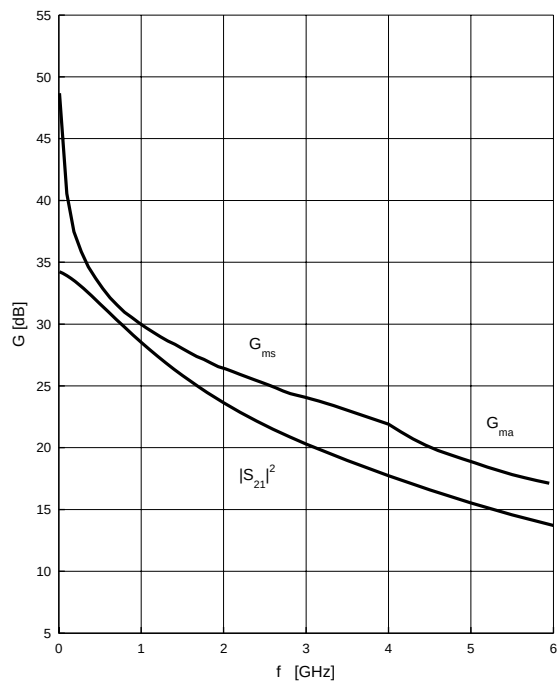
$f = 2 \text{ GHz}$

V_{CE} = parameter



Power gain $G_{ma}, G_{ms} = f(f)$

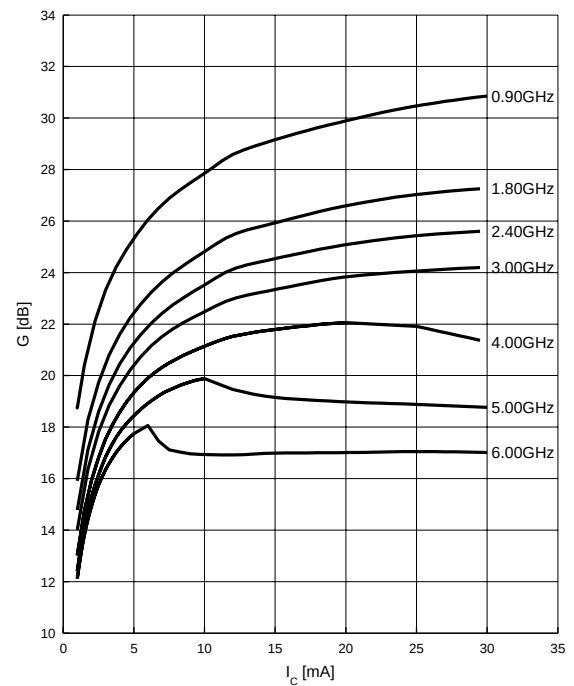
$V_{CE} = 3 \text{ V}, I_C = 25 \text{ mA}$



Power gain $G_{ma}, G_{ms} = f(I_C)$

$V_{CE} = 3 \text{ V}$

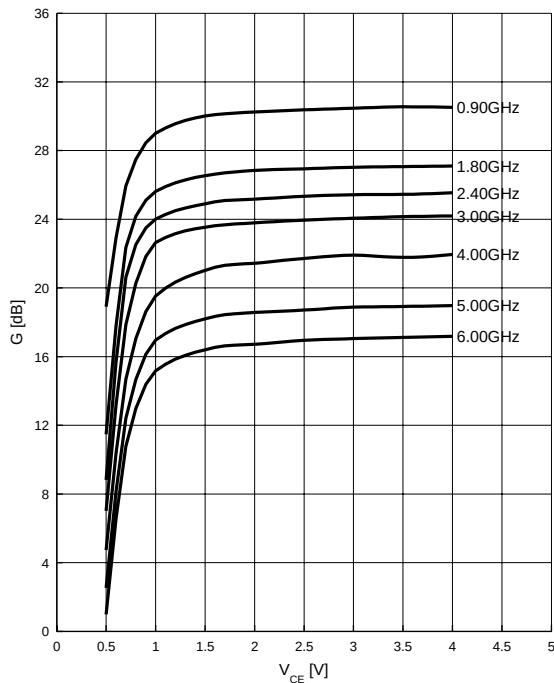
f = parameter



Power gain G_{ma} , $G_{ms} = f(V_{CE})$

$I_C = 25 \text{ mA}$

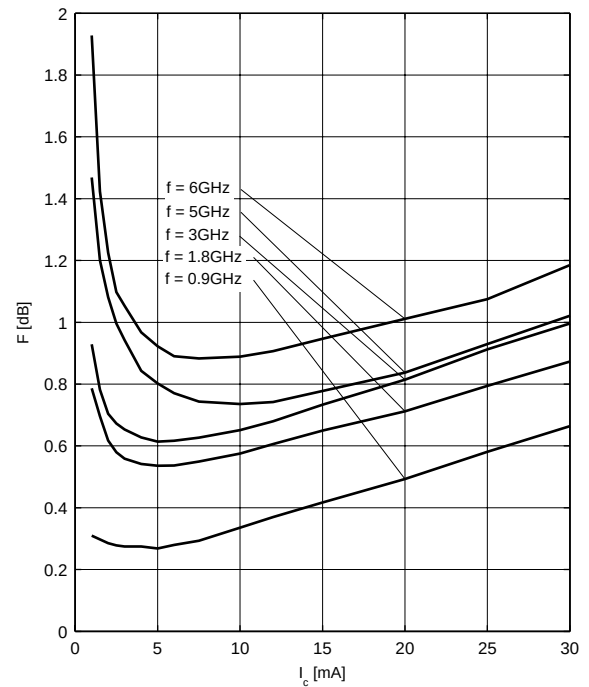
$f = \text{parameter}$



Noise figure $F = f(I_C)$

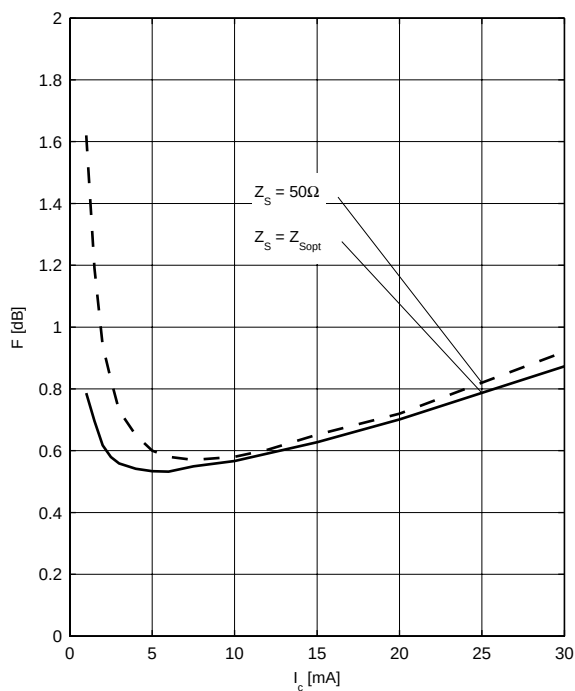
$V_{CE} = 3 \text{ V}$, $f = \text{parameter}$

$Z_S = Z_{Sopt}$



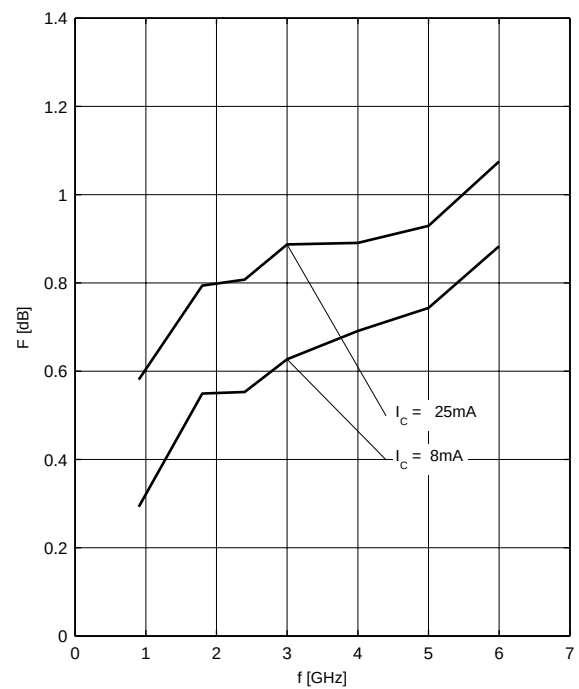
Noise figure $F = f(I_C)$

$V_{CE} = 3 \text{ V}$, $f = 1.8 \text{ GHz}$



Noise figure $F = f(f)$

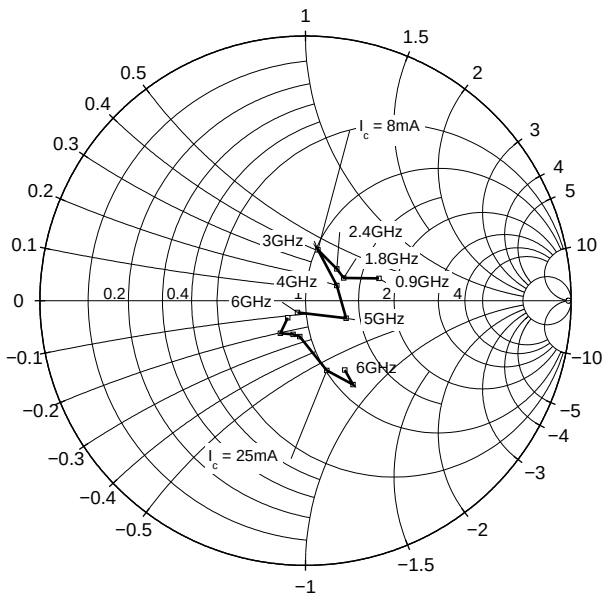
$V_{CE} = 3 \text{ V}$, $Z_S = Z_{Sopt}$



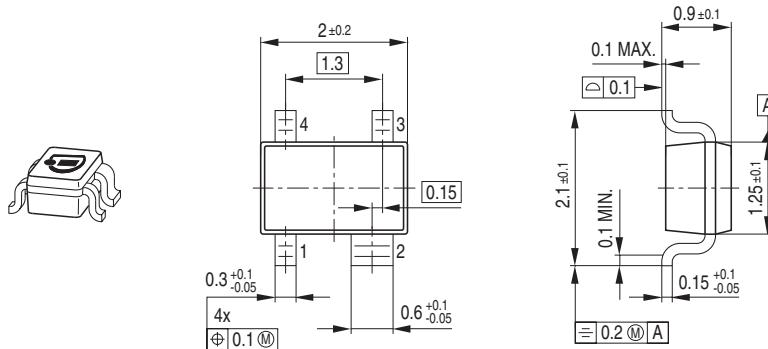
Source impedance for min.

noise figure vs. frequency

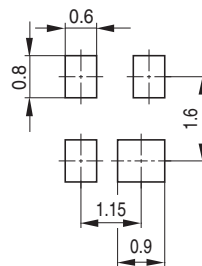
$V_{CE} = 3\text{ V}$, $I_C = 8\text{ mA} / 25\text{ mA}$



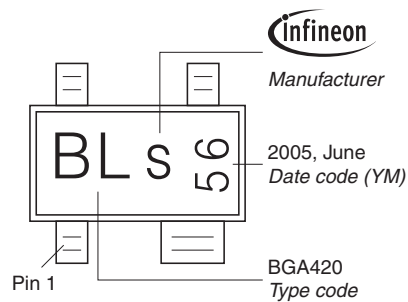
Package Outline



Foot Print

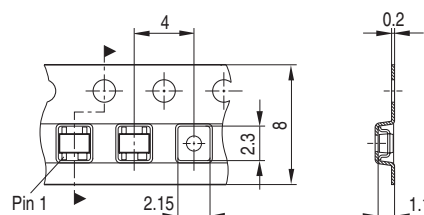


Marking Layout (Example)



Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



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